L 4877-66   EWT(m)   DIAAP
ACCESSION NR: AP5021144

UR/0386/65/002/001/0023/0027

AUTHOR: Chernavskiy, D. S.

TITLE: Possible connection between K_2^0 decay and statistical irreversibility

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 2, no. 1, 1965, 23-27

TOPIC TAGS: K meson, lepton, quantum statistics, irreversible process

ABSTRACT: The author proposes another explanation for the fact that data on the decay of K_2^0 mesons into two pions offer evidence of lack of CP invariance (and consequently of t-invariance) in this process, without foregoing CP invariance as a whole. The explanation involves application of statistical theory to a statistically-irreversible system of interacting particles or fields with a large number of degrees of freedom, in which an arbitrarily weak external interaction can give rise to a strong effect, so that the intensity of the external action is multiplied by a very large factor, which increases exponentially in time with increasing complexity of the system (with increasing level density, with increasing number of degrees of freedom, etc.). The physical cause of such an "amplification" of the external action, the origin of which becomes essentially immaterial, is the instability of the regular motion in the complex system against an infinitesimally

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small disturbance. It is assumed in particular that the decaying particle K_2^0 is itself a system with a large number of degrees of freedom, so that the statistical approach is applicable to its time evolution. Since the question of the degree of violation of CP invariance and of the fraction of the $K_2^0 \to 2\pi$ decays depends on concertization of the system, the author proposes a model in which there is a maximum violation of CP invariance in lepton decays after establishment of equilibrium. In this case the fraction of the expected $K_2^0 \to 2\pi$ decays agrees in order of magnitude with the observed value. Differences between this and earlier models are indicated. "The considerations advanced here were extensively discussed with Ye. L. Feynberg, M. I. Podgoretskiy, V. I. Ogiyevetskiy, A. M. Molchanov, D. A. Kirzhnits, I. M. Dremin, I. I. Royzen, and the entire staff of the Theoretical Division of the Physics Institute of the Academy of Sciences, to whom the author is grateful."

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences, SSSR)

SUBMITTED: 19May65   ENCL: 00   SUB CODE: GP

NR REF SOV: 001   OTHER: 005

CHERNAVSKIY, D.S.; IYERUSALIMSKIY, N.D.

Determinative link in the system of enzyme reactions. Izv. AN
SSSR. Ser. biol., no.5:666-676 S-O '65.   (MIRA 18:9)

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mikrobiologii AN SSSR.

L 21808-66   EWT(m)/T
ACC NR: AP6012192   SOURCE CODE: UR/0386/66/003/008/0340/0344

AUTHOR: Maksimenko, V. M.; Sisakyan, I. N.; Feynberg, Ye. L.; Chernavskiy, D. S.

ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences, SSSR (Fizicheskiy institut Akademii nauk SSSR)

TITLE: The cross section of quark generation

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 3, no. 8, 1966, 340-344

TOPIC TAGS: quantum electrodynamics, strong nuclear interaction, nuclear cross section, collision cross section, quark

ABSTRACT: The authors show that both independent experiment and the theory yield for the quark generation cross section a value some 5 orders of magnitude larger than would follow from estimates based on the absence of quarks from pN collisions in accelerators or cosmic rays. The basic assumption is that at the particular interaction distances the qN or qπ (q = quark) interaction is essentially the usual one for NN and πN. The dependence of the cross section for the generation of pairs of heavy strongly-interacting particles on their mass can be deduced from accelerator experiments on the generation of $\bar{p}$ (antiprotons) and $\bar{d}$ (antideuterons), and also Σ^- and Y_1^*. From an estimate of the ratio of their numbers $n_{\bar{p}}$ and $n_{\bar{d}}$

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D. S. CHERNAVSKIY, Ye. L. FEINBERG

Cosmic Rays and Theory of Strong Interactions

report submitted for the 8th Intl. Conf. on Cosmic Rays (IUPAP), Jaipur, India,
2-14 Dec 1963

ACCESSION NR: AP4019229   S/0056/64/046/002/0628/0636

AUTHOR: Royzen, I. I.; Chernavskiy, D. S.

TITLE: Intersection of vacuum pole trajectories

SOURCE: Zhurnal eksper. i teor. fiz., v. 46, no. 2, 1964, 628-636

TOPIC TAGS: Regge pole, vacuum Regge pole trajectory, many particle state, t channel, pole trajectory crossing, moving pole method, proton proton scattering, pion proton scattering, asymptotic scattering amplitude

ABSTRACT: In view of the discrepancies between recent experimental data on pp and π^-p scattering (K. J. Foley et al., Phys. Rev. Lett. v. 10, 376, 1963) and the theoretical predictions based on the method of moving poles (V. N. Gribov, ZhETF v. 42, 1260, 1962 and 41, 1962, 1951), the authors consider the possibility of crossing of several vacuum pole trajectories at the point $\ell = 1$ for $t = 0$, in connection with the problem of allowance for the contribution of many particle states in the t-channel. Crossing of two trajectories is examined in great detail. The analysis explains the cited experi-

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mental data on π^-p and pp scattering and yields a definite relation between the total cross sections of the processes. A simple example wherein a non-decreasing asymptotic value is obtained for the elastic scattering cross section within the framework of the Regge method is presented. While the asympotote does not decrease, it is likewise not purely diffractional. If there are more than two conjugate poles, then the diffraction behavior is approached. The possible existence of crossing trajectories is discussed. "The authors are grateful to Ye.L. Feynberg for valuable advice and continuous interest in the work." Orig. art. has: 1 figure and 39 formulas.

ASSOCIATION: Fizicheskiy institut im. P.N.Lebedeva AN SSSR (Physics Institute, AN SSSR)

SUBMITTED: 05Jul63   DATE AOQ: 27Mar64   ENCL: 00

SUB CODE: PH   NO REF SOV: 006   OTHER: 004

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